AMENDMENTS TO CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Canceled)

2. (Previously Presented) The method of claim 58, wherein said illumination is electromagnetic radiation selected from the group consisting of infrared, visible, ultraviolet and X-ray radiation.

3. (Previously Presented) The method of claim 58, wherein said illumination is radiation selected from the group consisting of pulsating radiation, coherent radiation, monochromatic radiation, parallel radiation and radiation which can be focused in different planes.

4. (Previously Presented) The method of claim 58, wherein said selected predetermined areas are illuminated in parallel.

5. (Previously Presented) The method of claim 58, wherein said illumination matrix is a reflection matrix having a controllably deformable mirror arrangement.

6. (Previously presented) The method of claim 5, wherein said reflection matrix is selected from the group consisting of a light modulator with viscoelastic control layers and a light modulator with micromechanical mirror arrays.

7. (Previously Presented) The method of claim 58, wherein said illumination matrix is selected from the group consisting of a laser array and a diode array.

8. (Previously Presented) The method of claim 58, wherein said biochip carrier is an optically transparent carrier.

9. (Previously Presented) The method of claim 58, wherein said biochip carrier has a surface selected from the group consisting of glass and plastics.

10. (Previously Presented) The method of claim 58, wherein said selected predetermined areas each are from 1 μm^2 to 1 cm^2.

11. (Previously Presented) The method of claim 58, wherein said selected predetermined areas each are surrounded by nonactivated areas.

12-17. (Canceled).

18. (Previously Presented) The method of claim 58, wherein said illumination takes place at a rate of from 1/10000 to 1000 light patterns per second.

19-20. (Canceled)

21. (Previously Presented) The method of claim 58, wherein said biochip carrier is precalibrated using the illumination matrix and light sensor detection matrix.

22-26. (Canceled).

27. (Previously Presented) The method of claim 58,

(a) wherein said biochip carrier has a surface which comprises photoactivatable groups located on predetermined areas of said biochip carrier surface and wherein said programmable illumination matrix is a UV light source array comprising a plurality of individually controllable light sources; and
(b) wherein said specific two-dimensional light exposure pattern activates said photoactivatable groups on said selected predetermined areas of said biochip carrier surface.

28-36. (Canceled).

37. (Previously Presented) The method of claim 27, which further comprises binding materials selected from the group consisting of (1) biologically functional materials, (2) chemically functional materials, (3) building blocks for said biologically functional materials and (4) building blocks for said chemically functional materials to said activated groups on said selected predetermined areas of said biochip carrier surface.

38. (Previously Presented) The method of claim 37, wherein said biologically or chemically functional materials or building blocks thereof are selected from the group consisting of nucleic acids, nucleotides, oligonucleotides, nucleic acid analogs, PNA, peptides, proteins, amino acids, saccharides, cells, cell organelles, cell membrane preparations, viral particles, cell aggregates, allergens, pathogens, pharmacological active substances and diagnostic reagents.

39. (Previously Presented) The method of claim 37, which further comprises synthesizing said biologically or chemically functional materials on said biochip carrier in two or more stages from monomeric or oligomeric building blocks.

40. (Previously Presented) The method of claim 37, wherein said biologically or chemically functional materials are a library comprising a multiplicity of different biologically or chemically functional materials.

41. (Previously Presented) The method of claim 27, wherein activating photoactivatable groups comprises cleaving a protective group on the photoactivatable groups on said selected predetermined areas of said biochip carrier surface.

42-43. (Canceled).

44. (Previously Presented) The method of claim 37, which further comprises removing materials bound on the carrier.

45. (Previously Presented) The method of claim 44, wherein said removed materials are used as building blocks for further synthesis of polymers.

46. (Previously Presented) The method of claim 58, wherein said light sensor detection matrix is a CCD matrix.

47. (Previously Presented) The method of claim 58, wherein said biochip carrier has a surface selected from the group consisting of silicon, germanium arsenide and gallium arsenide.

48. (Previously presented) The method of claim 9, wherein said glass is quartz glass.

49. (Previously presented) The method of claim 10, wherein said selected predetermined areas each are from 100 μm^2 to 1 mm^2.

50. (Previously presented) The method of claim 18, wherein said illumination takes place at a rate of from 1/10 to 100 light patterns per second.

51-56. (Canceled).

57. (Previously presented) A method of claim 27 wherein said UV light source array is selected from the group consisting of a diode array, a UV laser array, and both a diode array and a UV laser array.

58. (Currently Amended) A method of biochip manufacture, which comprises
(a) providing a programmable illumination matrix and a light sensor detection matrix, wherein said illumination matrix and said detection matrix are arranged facing each other such that the detection matrix is situated in the light path of the

illumination matrix and such that the detection matrix can detect light from the illumination matrix;

(b) positioning a transparent biochip carrier, wherein said carrier has a surface that comprises photoactivatable groups located thereon in predetermined areas of said biochip carrier surface, between said illumination matrix and said detection matrix and in the light path of said illumination matrix such that light from the illumination matrix illuminates and is transmitted through said biochip carrier and to said detection matrix;

(c) specifically illuminating said biochip carrier to produce [[a]]an adjustable two-dimensional light exposure pattern that illuminates selected predetermined areas of said biochip carrier;

(d) monitoring and controlling the quality of said specific ~~illumination~~ two-dimensional light exposure pattern by detecting the location of the ~~illumination~~ illuminated areas of said two-dimensional light exposure pattern on said biochip carrier using the detection matrix[[;]] and ~~(e) optionally~~ adjusting said two-dimensional light exposure pattern where appropriate, taking into account the information obtained by said monitoring.